S03P0940US00

FIG. 1

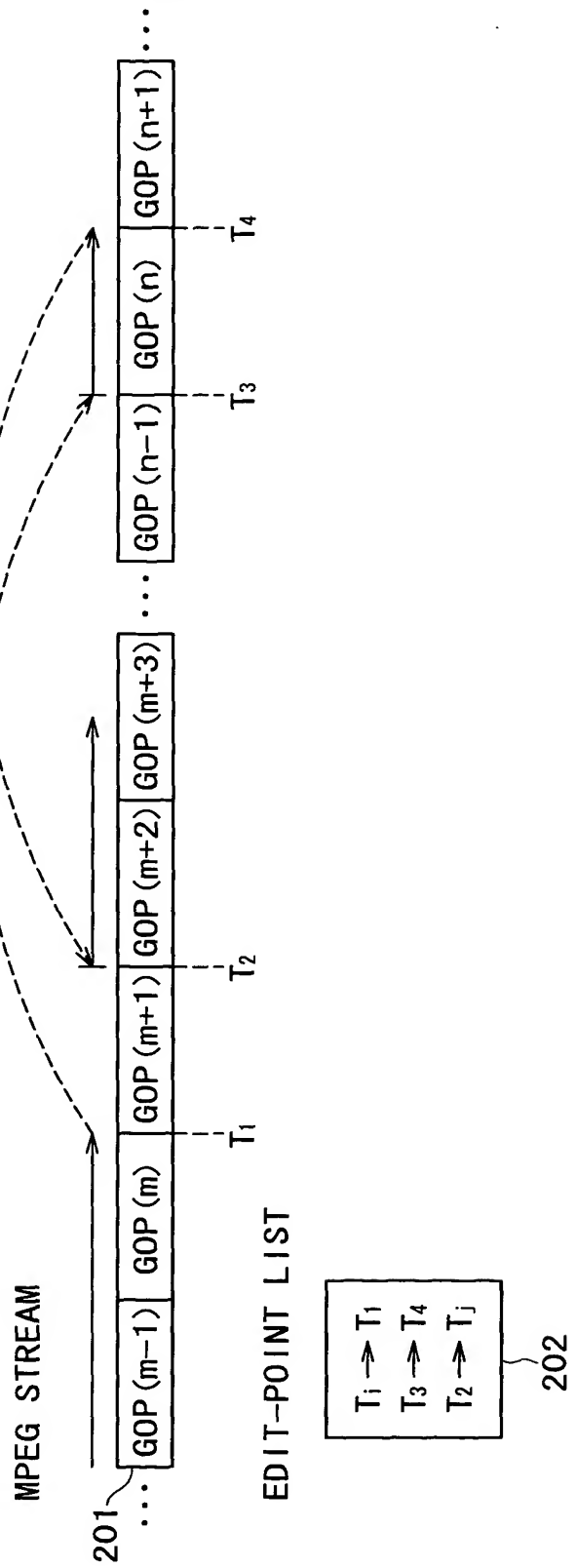
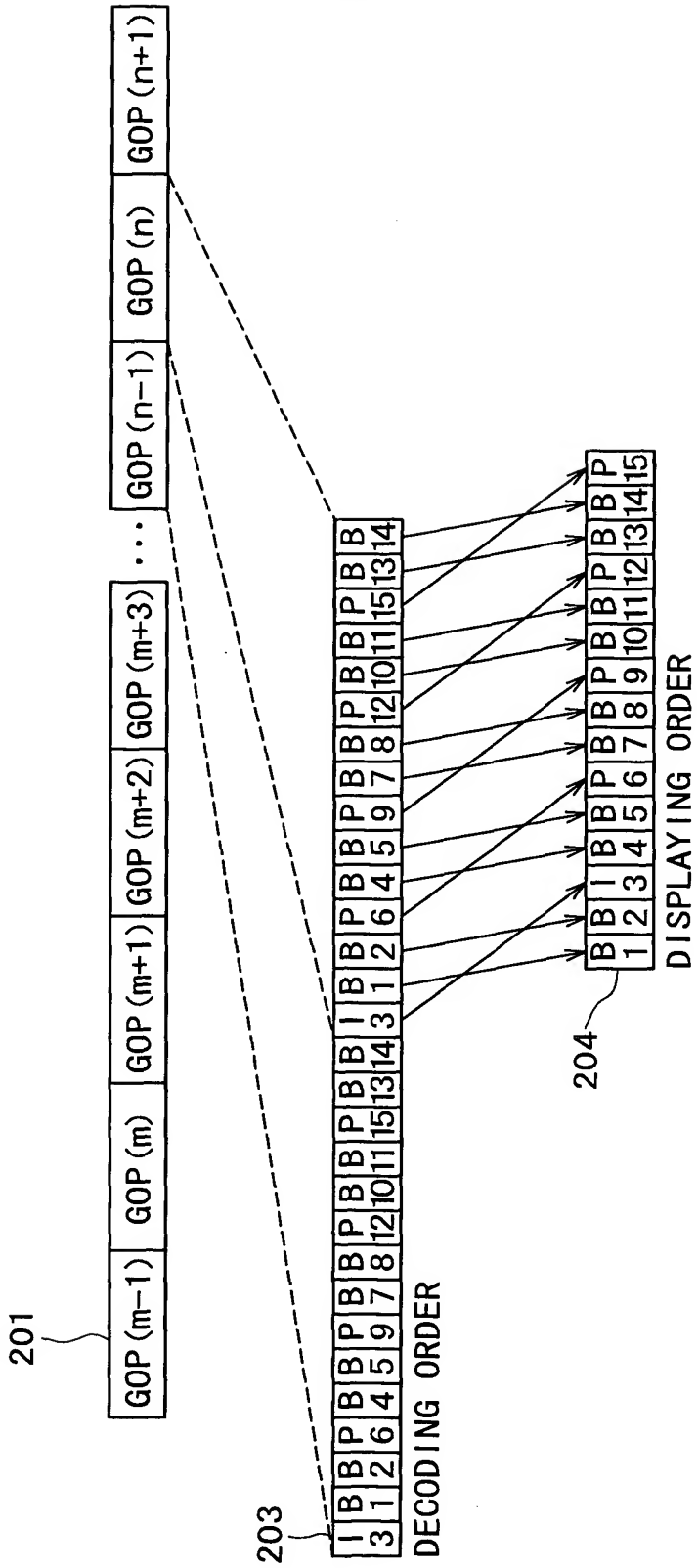


FIG. 2


201
GOP (m-1)
GOP (m)
GOP (m+1)
GOP (m+2)
GOP (m+3)
GOP (n-1)
GOP (n)
GOP (n+1)
203
I B B P B B P B B P B B I B B P B B P B B P B B P B B
3 1 2 6 4 5 9 7 8 12 10 11 15 13 14 3 1 2 6 4 5 9 7 8 12 10 11 15 13 14
DECODING ORDER
204
B B I B B P B B P B B P B B P
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
DISPLAYING ORDER

F I G. 3

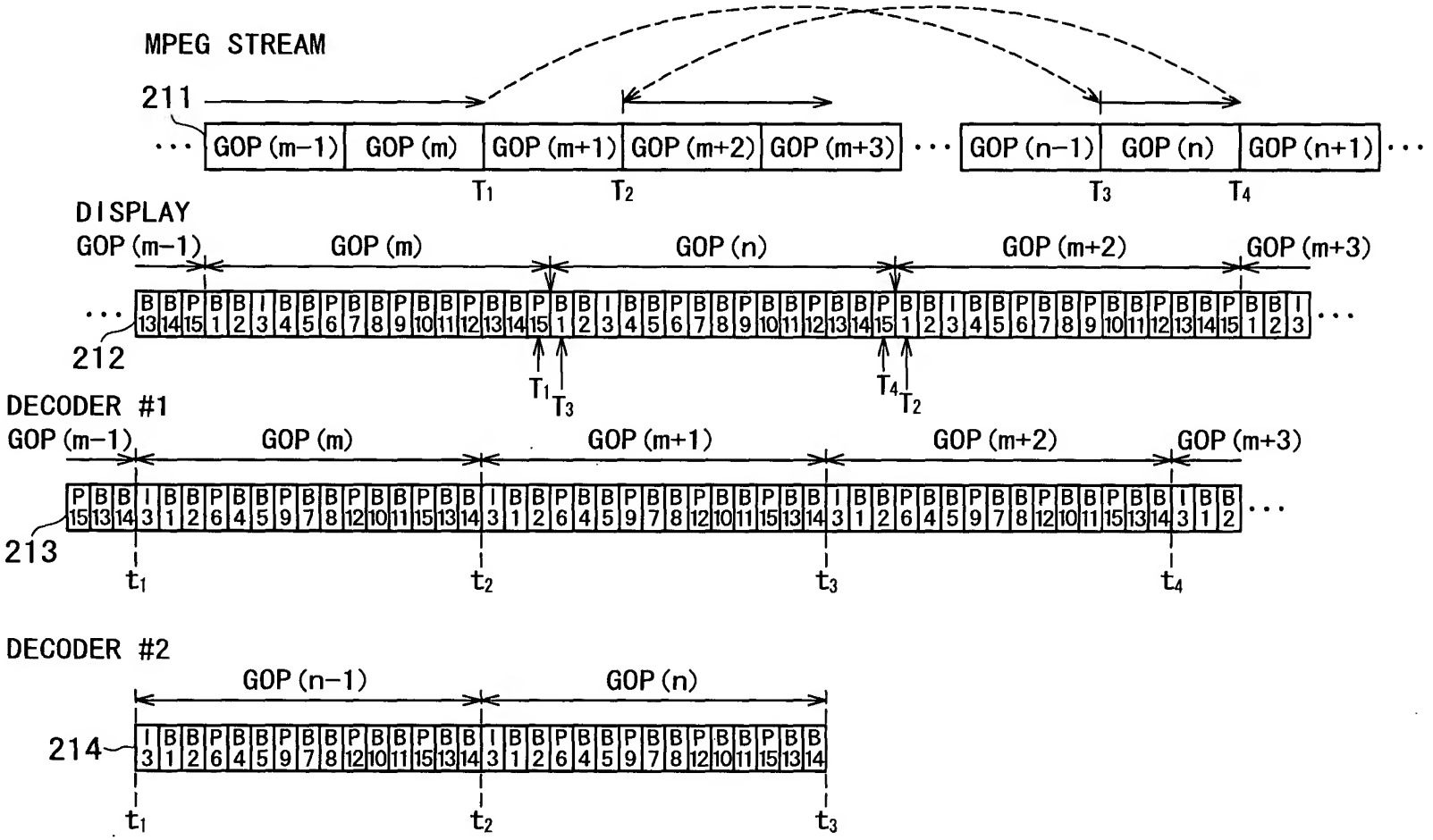

MPEG STREAM
211
GOP (m−1)
GOP (m)
GOP (m+1)
GOP (m+2)
GOP (m+3)
GOP (n−1)
GOP (n)
GOP (n+1)
T1
T2
T3
T4
DISPLAY
GOP (m−1)
GOP (m)
GOP (n)
GOP (m+2)
GOP (m+3)
212
DECODER #1
GOP (m−1)
GOP (m)
GOP (m+1)
GOP (m+2)
GOP (m+3)
213
t1
t2
t3
t4
DECODER #2
GOP (n−1)
GOP (n)
214

FIG. 4

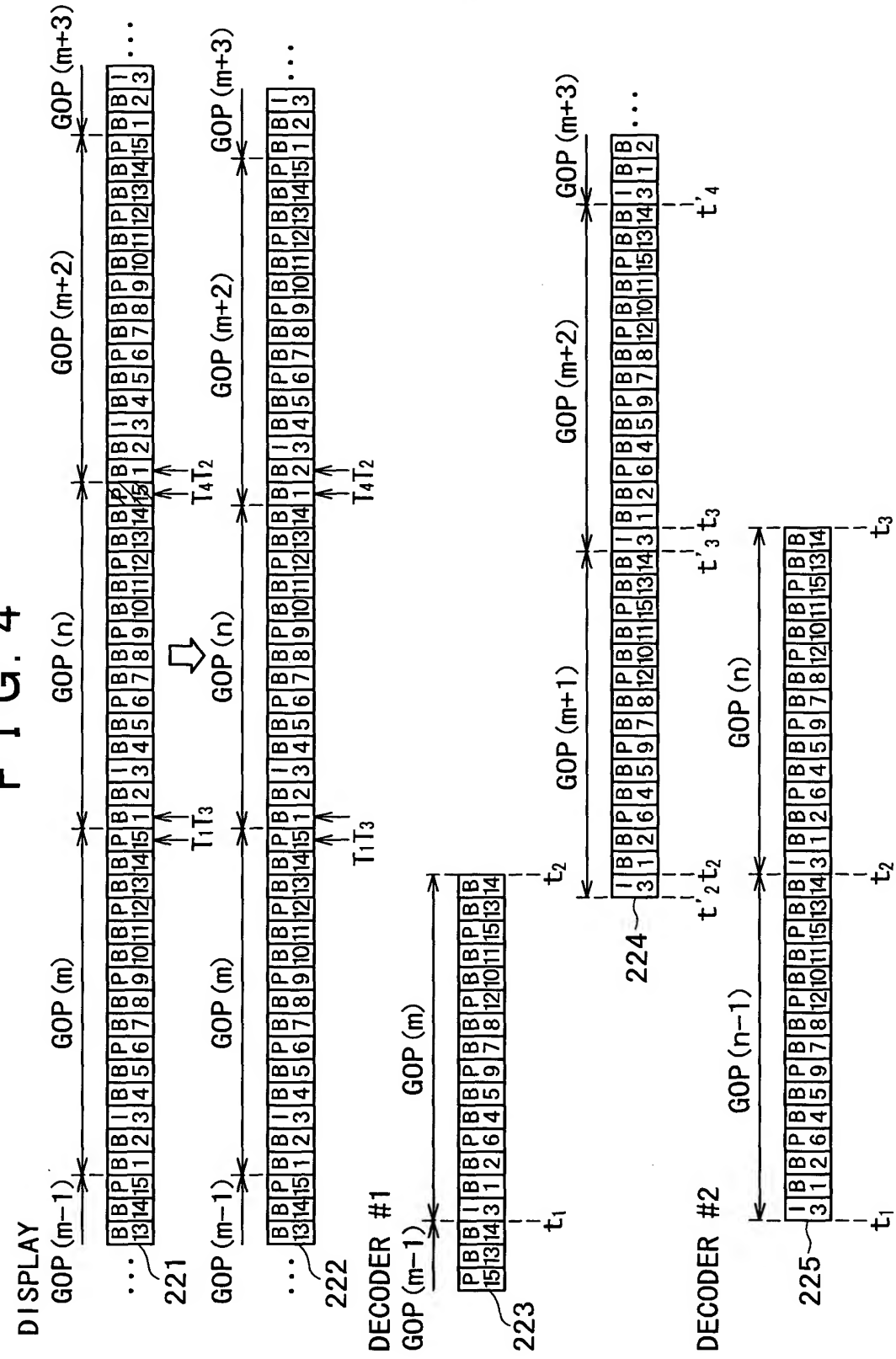

DISPLAY
GOP (m-1)
GOP (m)
GOP (n)
GOP (m+2)
GOP (m+3)
221
222
223
224
225
DECODER #1
DECODER #2
T1 T3
T4 T2
t1
t2
t3
t'2 t2
t'3 t3
t'4

FIG. 5

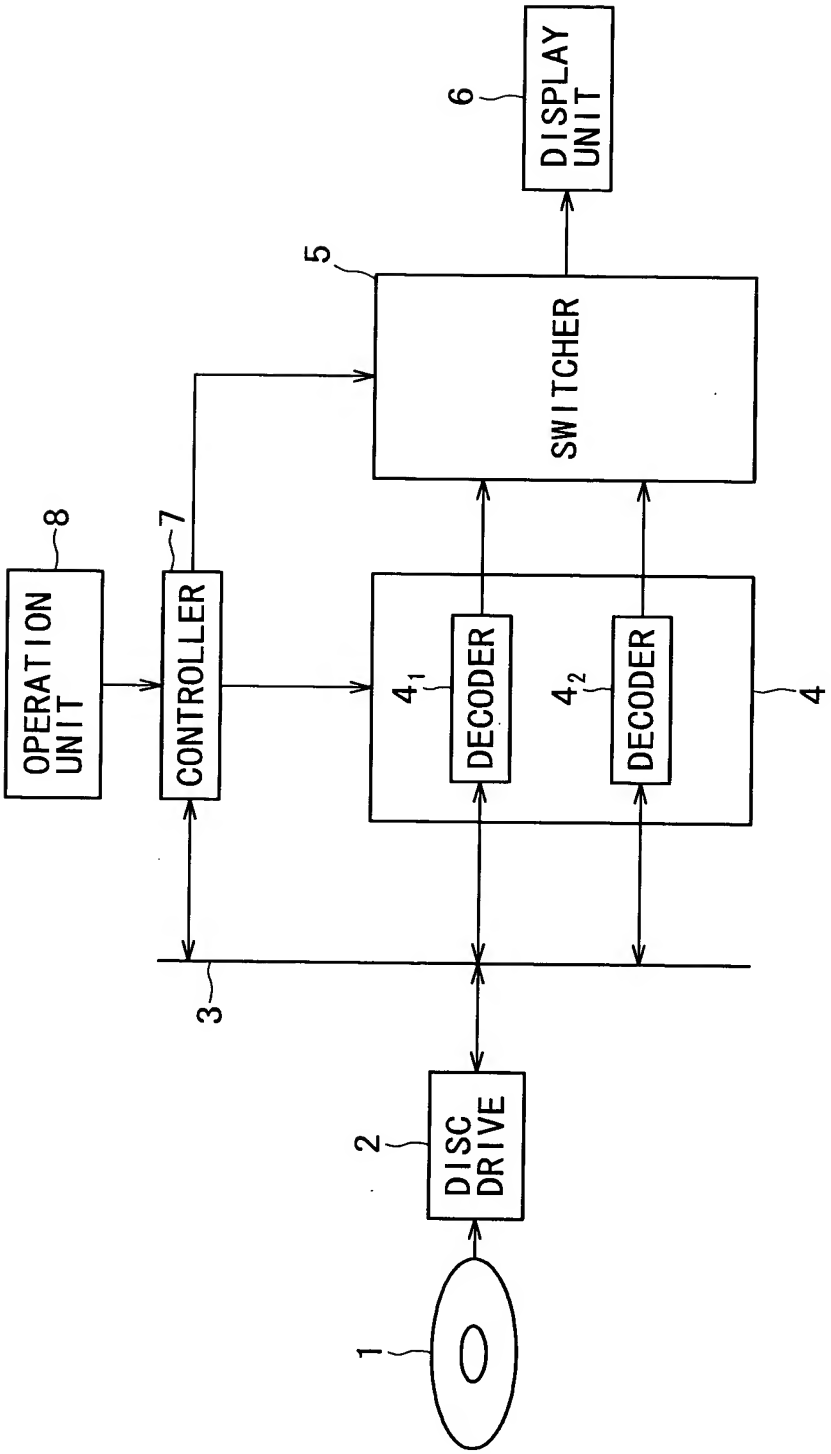

1
2
DISC DRIVE
3
4
4_1
DECODER
4_2
DECODER
5
SWITCHER
6
DISPLAY UNIT
7
CONTROLLER
8
OPERATION UNIT

FIG. 6

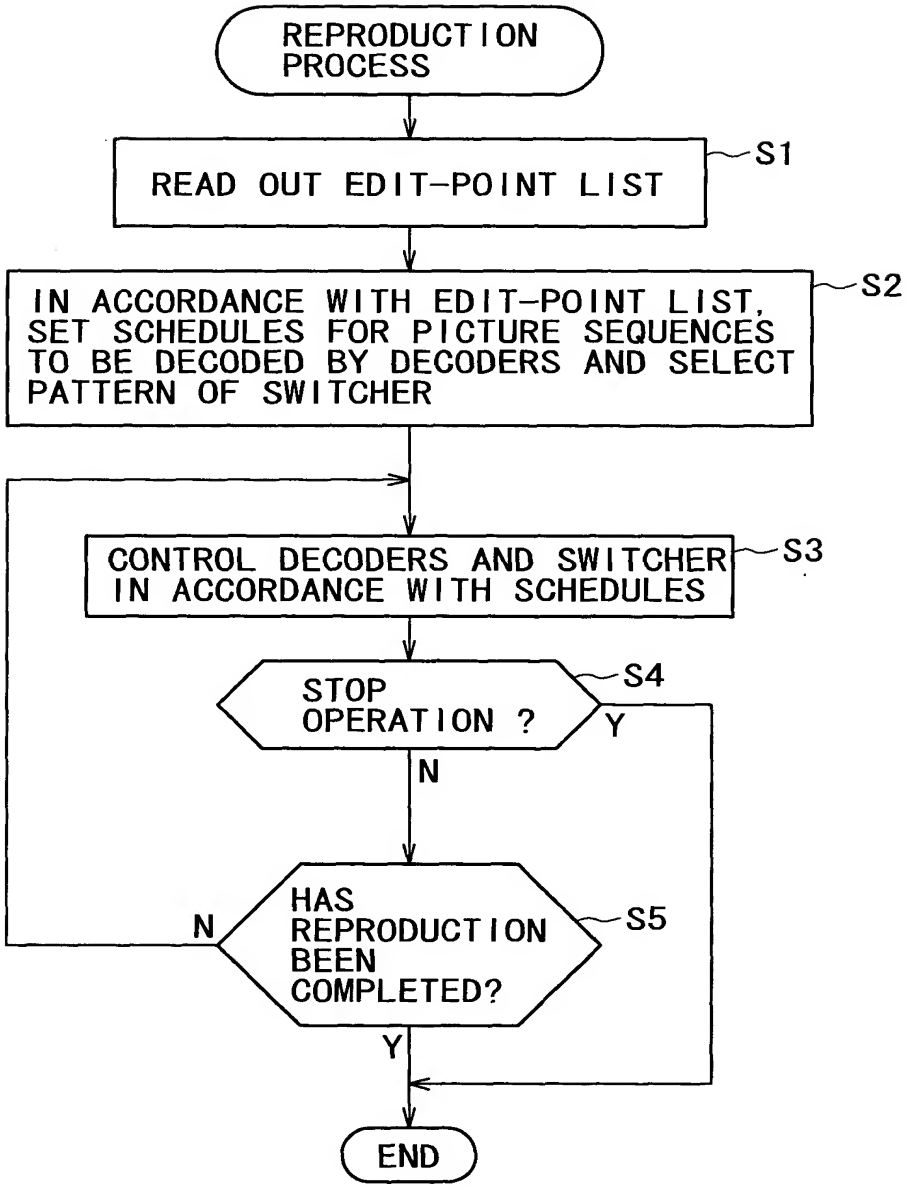

REPRODUCTION PROCESS
READ OUT EDIT-POINT LIST
S1
IN ACCORDANCE WITH EDIT-POINT LIST, SET SCHEDULES FOR PICTURE SEQUENCES TO BE DECODED BY DECODERS AND SELECT PATTERN OF SWITCHER
S2
CONTROL DECODERS AND SWITCHER IN ACCORDANCE WITH SCHEDULES
S3
STOP OPERATION ?
S4
Y
N
HAS REPRODUCTION BEEN COMPLETED?
S5
N
Y
END

FIG. 7

EDIT-POINT PICTURE	PICTURE SEQUENCES
B1	GOP(n-1){I3, P6, P9, P12, P15}, GOP(n){I3, B1, B2, P6, B4...
B2	GOP(n-1){I3, P6, P9, P12, P15}, GOP(n){I3, B2, P6, B4...
I3	GOP(n){I3, P6, B4, B5, P9, B7, B8, P12, B10, ...}, ...
B4	GOP(n){I3, P6, B4, B5, P9, B7, B8, P12, B10, ...}, ...
B5	GOP(n){I3, P6, B5, P9, B7, B8, P12, B10, ...}, ...
P6	GOP(n){I3, P6, P9, B7, B8, P12, B10, ...}, ...
B7	GOP(n){I3, P6, P9, B7, B8, P12, B10, ...}, ...
B8	GOP(n){I3, P6, P9, B8, P12, B10, ...}, ...
P9	GOP(n){I3, P6, P9, P12, B10, ...}, ...
B10	GOP(n){I3, P6, P9, P12, B10, B11, P15, B13, B14}, ...
B11	GOP(n){I3, P6, P9, P12, B11, P15, B13, B14}, ...
P12	GOP(n){I3, P6, P9, P12, P15, B13, B14}, ...
B13	GOP(n){I3, P6, P9, P12, P15, B13, B14}, ...
B14	GOP(n){I3, P6, P9, P12, P15, B14}, ...
P15	GOP(n){I3, P6, P9, P12, P15}, ...

FIG. 8

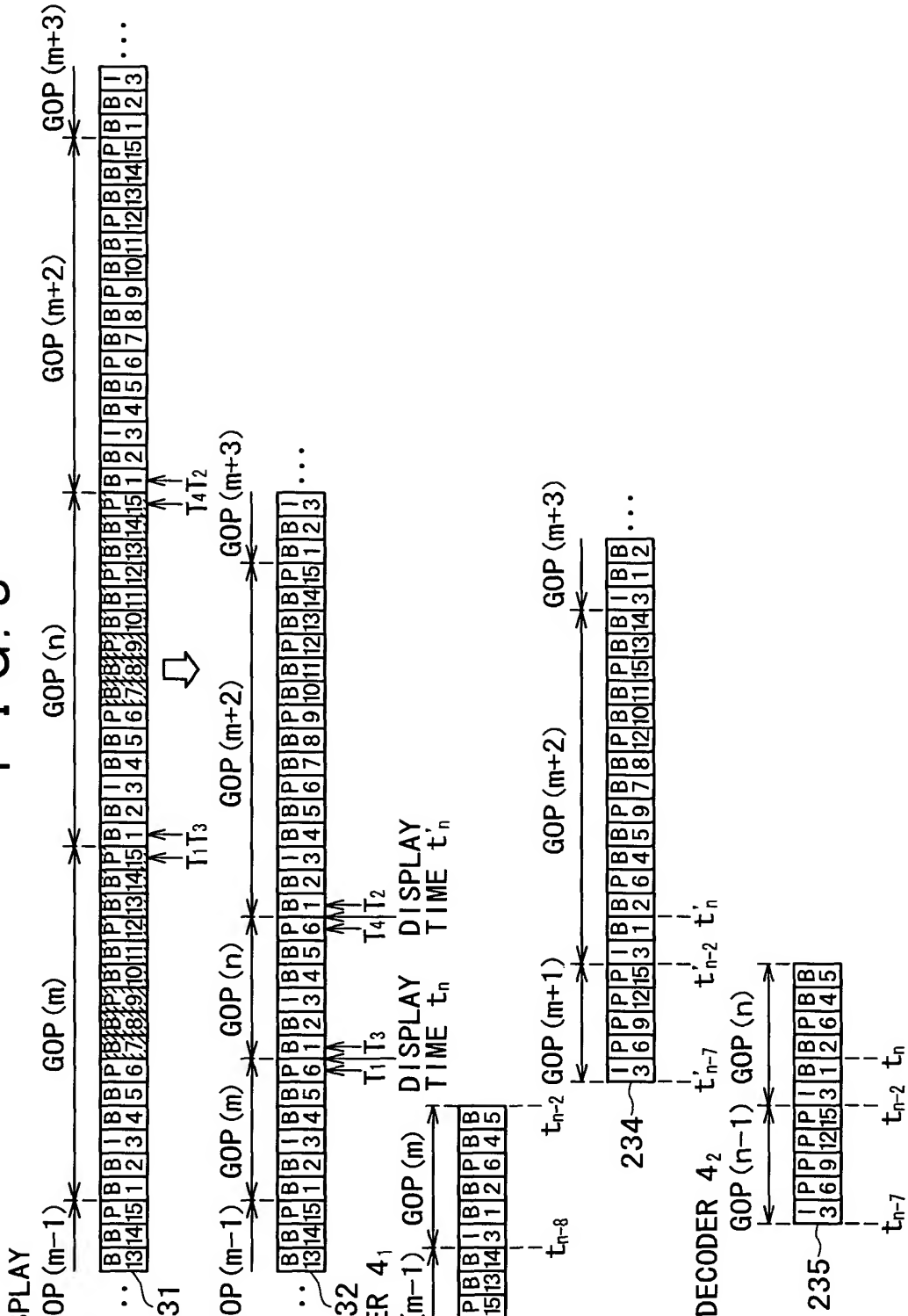

DISPLAY
GOP (m-1)
GOP (m)
GOP (n)
GOP (m+2)
GOP (m+3)
231
232
233
234
235
DECODER 4₁
DECODER 4₂
DISPLAY TIME tn
DISPLAY TIME t'n
T1 T3
T4 T2
tn-8
tn-2
t'n-7
t'n-2
t'n
tn-7
GOP (n-1)
GOP (m+1)

FIG. 9

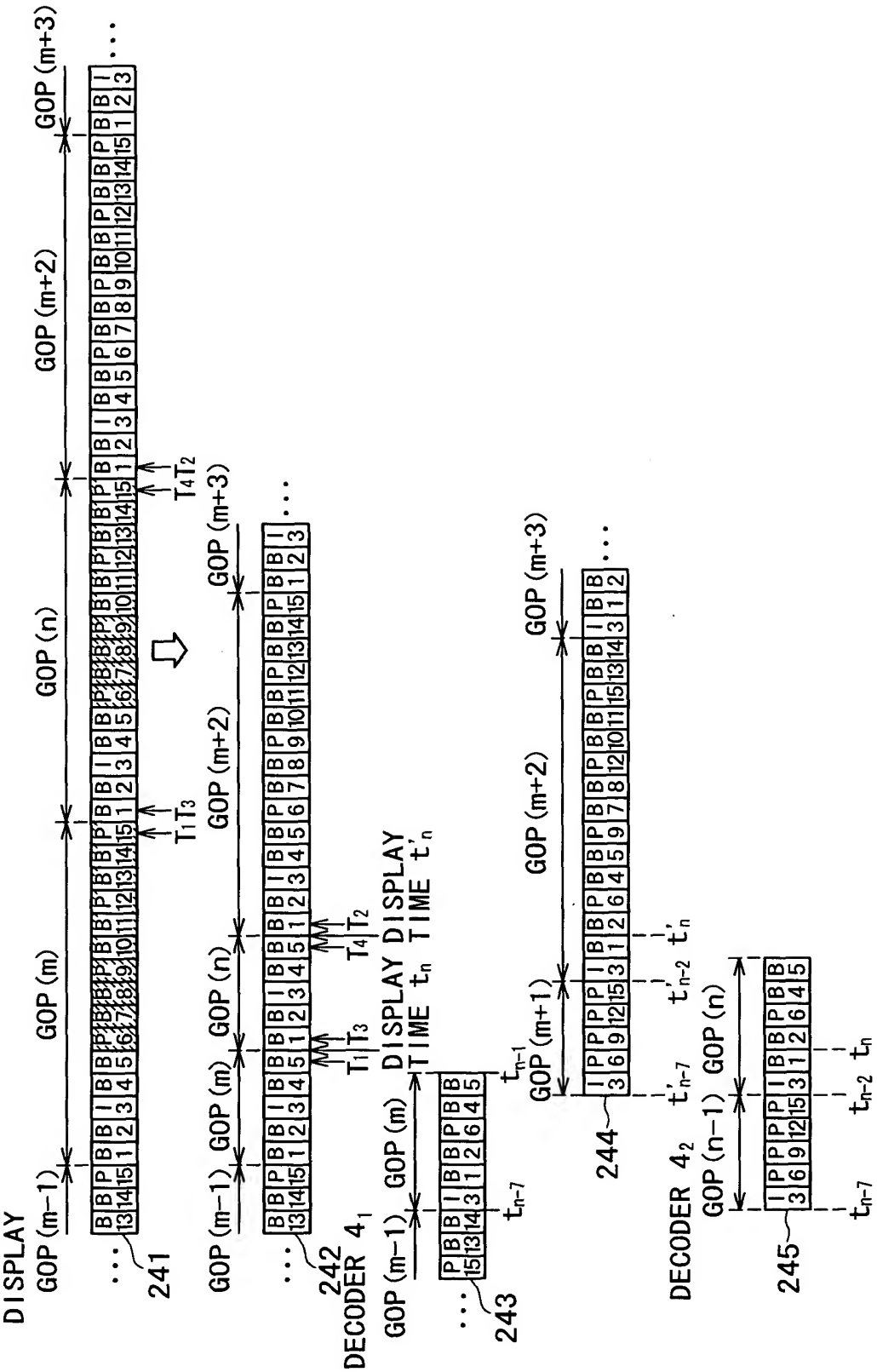

DISPLAY
GOP (m-1)
GOP (m)
GOP (n)
GOP (m+2)
GOP (m+3)
241
T1 T3
T4 T2
242
DECODER 4 1
DISPLAY TIME tn
DISPLAY TIME t'n
243
tn-7
tn-1
GOP (m+1)
244
t'n-7
t'n-2
t'n
DECODER 4 2
GOP (n-1)
245
tn-2
tn

FIG. 10

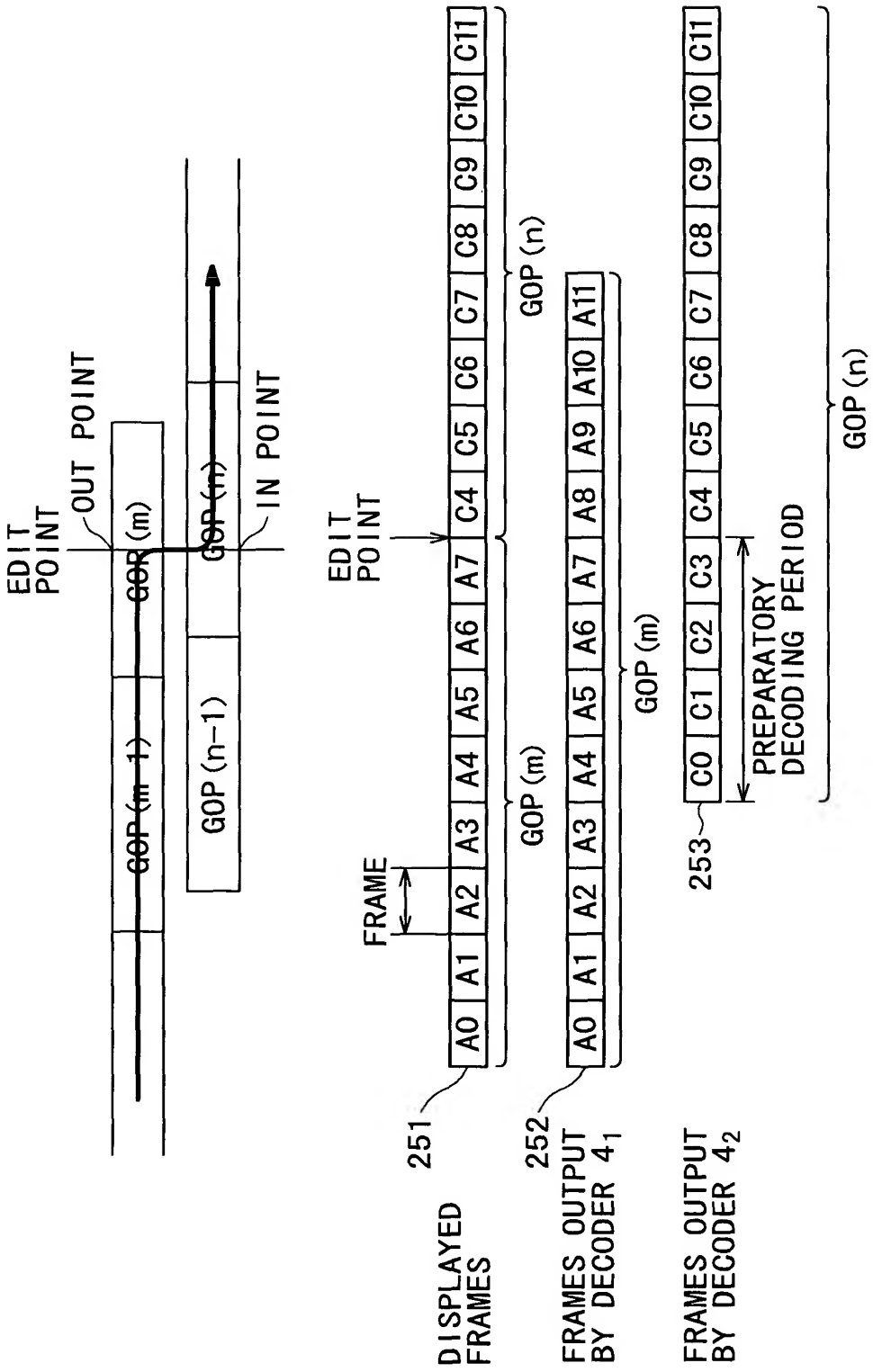

EDIT POINT
OUT POINT
GOP (m-1)
GOP (m)
GOP (n-1)
GOP (n)
IN POINT
EDIT POINT
FRAME
A0 A1 A2 A3 A4 A5 A6 A7 C4 C5 C6 C7 C8 C9 C10 C11
GOP (m)
GOP (n)
251
DISPLAYED FRAMES
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11
GOP (m)
252
FRAMES OUTPUT BY DECODER 4₁
C0 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11
253
PREPARATORY DECODING PERIOD
GOP (n)
FRAMES OUTPUT BY DECODER 4₂

FIG. 11

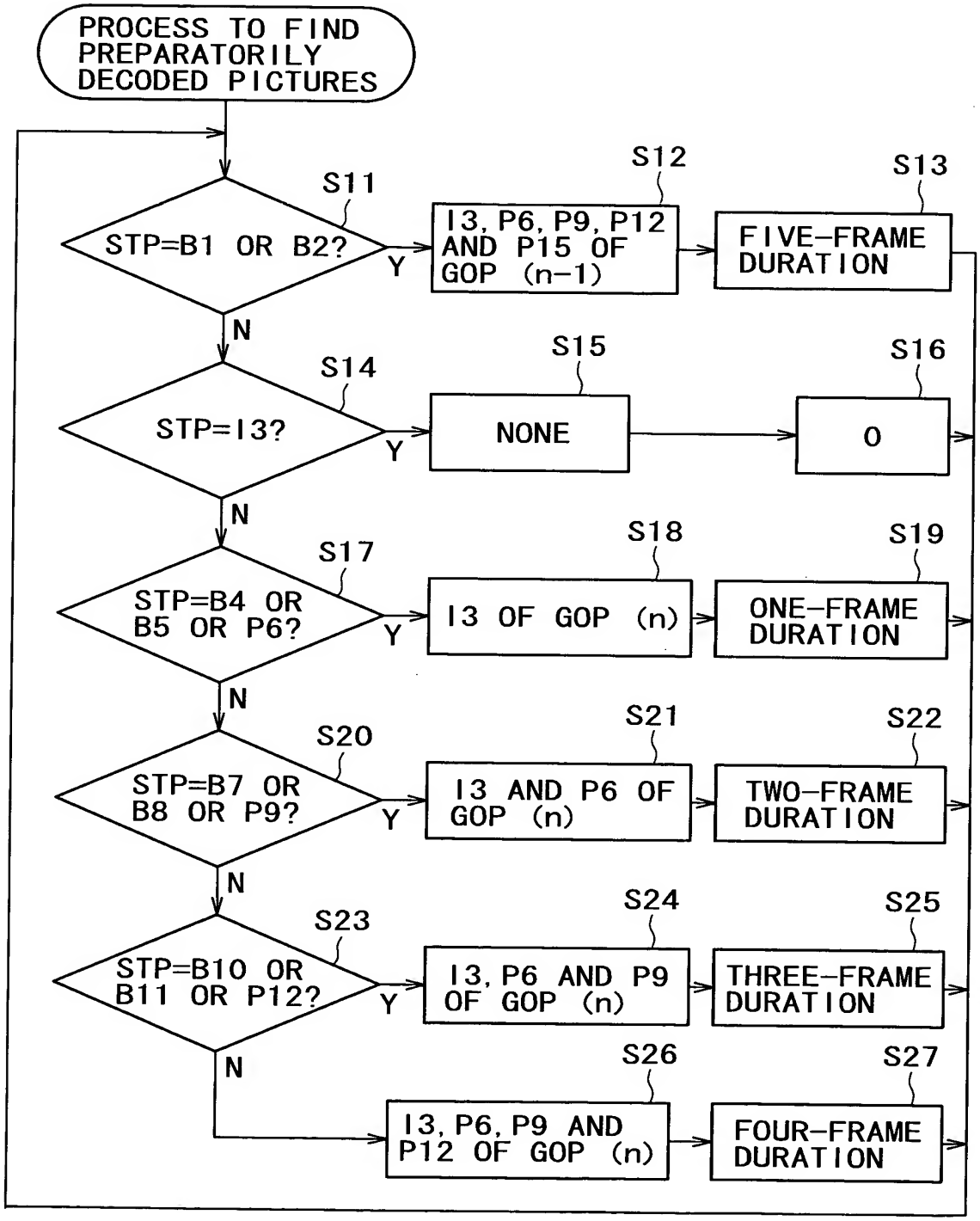

PROCESS TO FIND PREPARATORILY DECODED PICTURES
S11
STP=B1 OR B2?
Y
S12
I3, P6, P9, P12 AND P15 OF GOP (n-1)
S13
FIVE-FRAME DURATION
N
S14
STP=I3?
Y
S15
NONE
S16
0
N
S17
STP=B4 OR B5 OR P6?
Y
S18
I3 OF GOP (n)
S19
ONE-FRAME DURATION
N
S20
STP=B7 OR B8 OR P9?
Y
S21
I3 AND P6 OF GOP (n)
S22
TWO-FRAME DURATION
N
S23
STP=B10 OR B11 OR P12?
Y
S24
I3, P6 AND P9 OF GOP (n)
S25
THREE-FRAME DURATION
N
S26
I3, P6, P9 AND P12 OF GOP (n)
S27
FOUR-FRAME DURATION

FIG. 12

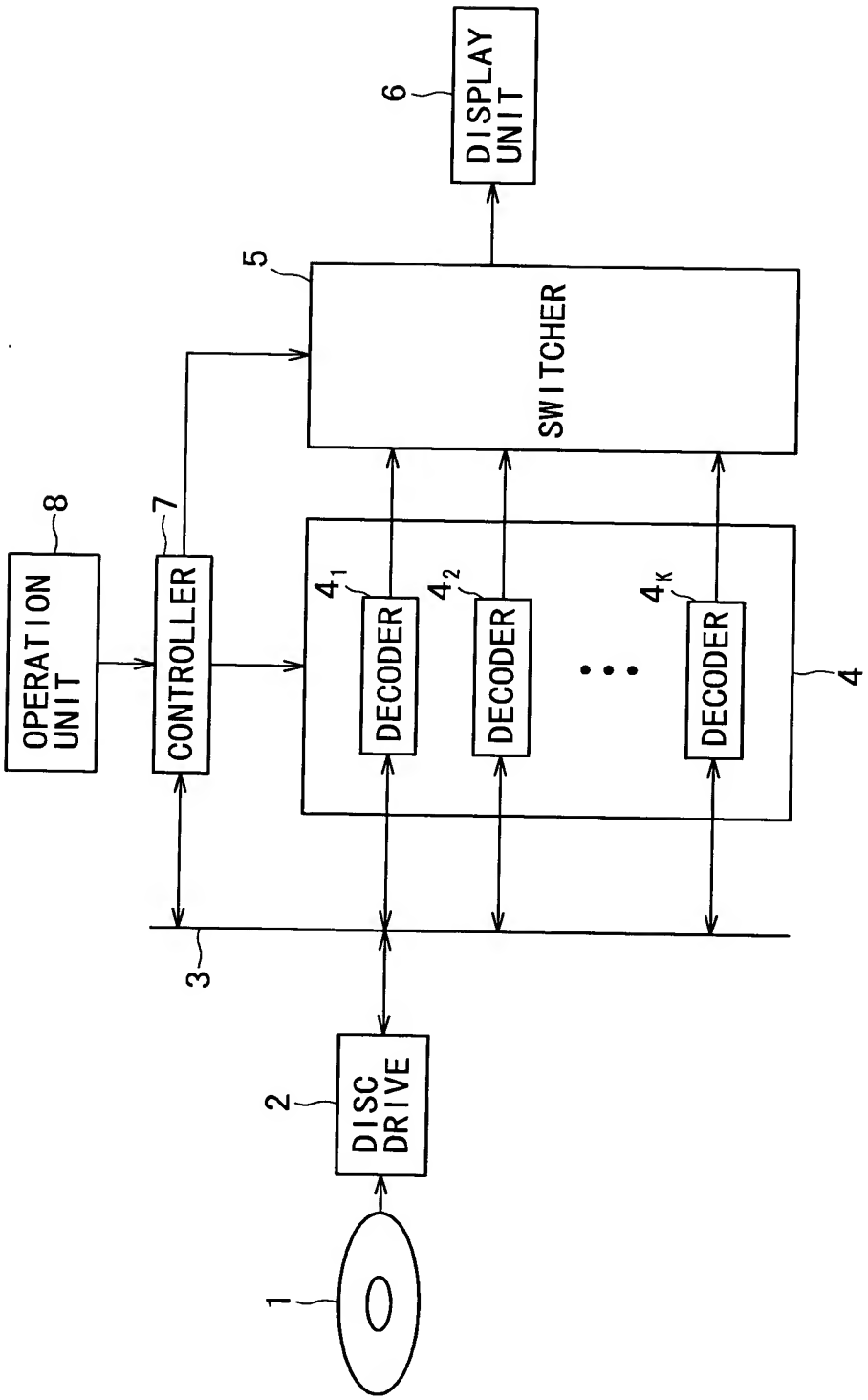

1
DISC DRIVE
2
3
4
4_1
4_2
4_K
DECODER
DECODER
DECODER
CONTROLLER
7
OPERATION UNIT
8
SWITCHER
5
DISPLAY UNIT
6

FIG. 13

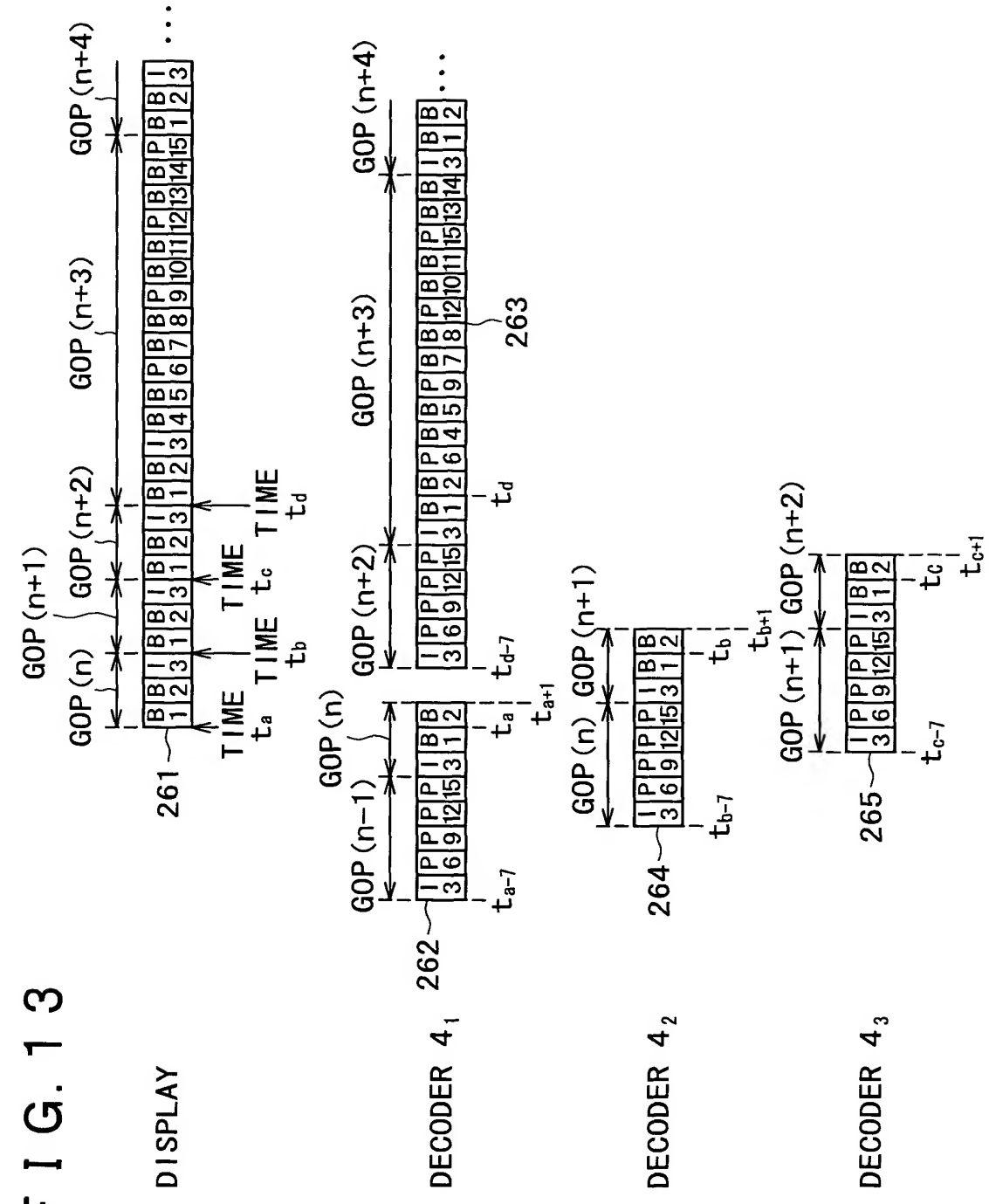

DISPLAY
DECODER 4₁
DECODER 4₂
DECODER 4₃
GOP (n-1)
GOP (n)
GOP (n+1)
GOP (n+2)
GOP (n+3)
GOP (n+4)
TIME
261
262
263
264
265
t_a
t_b
t_c
t_d
t_{a-7}
t_{a+1}
t_{b-7}
t_{b+1}
t_{c-7}
t_{c+1}

FIG. 14

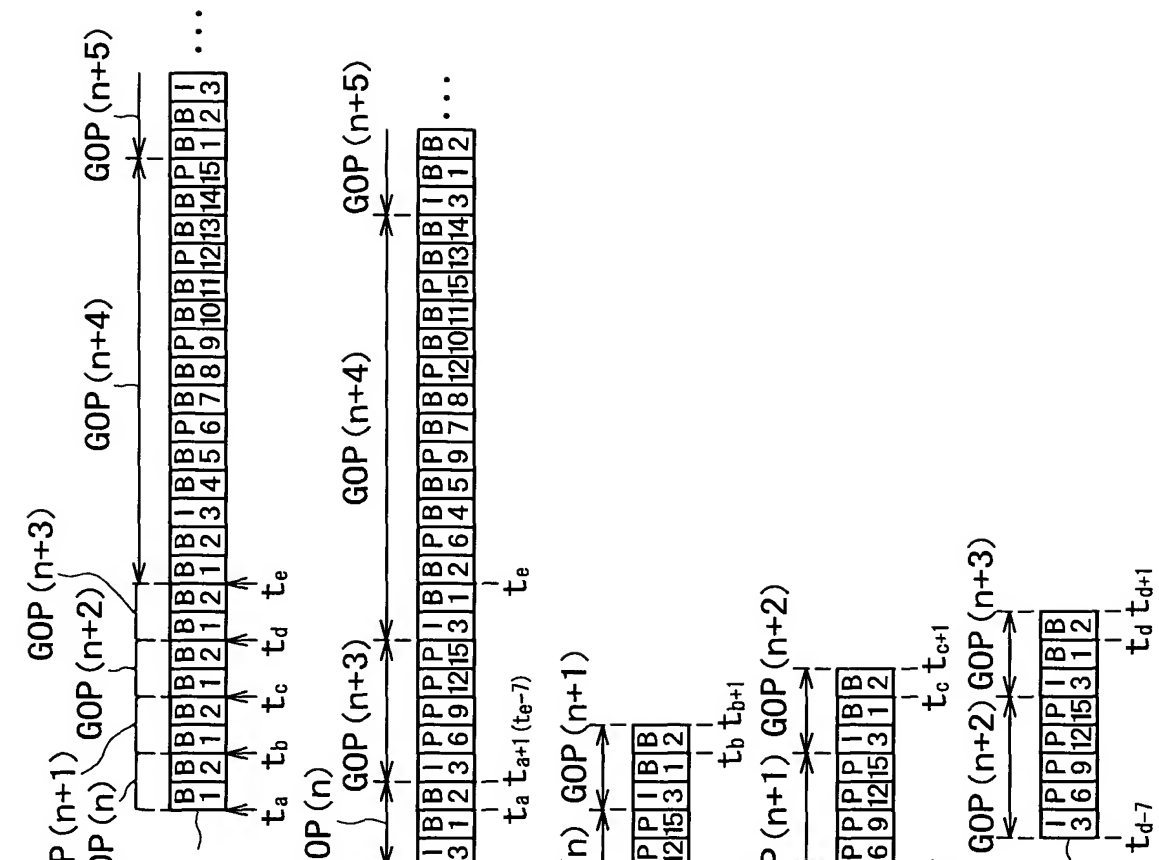

DISPLAY
DECODER 4₁
DECODER 4₂
DECODER 4₃
DECODER 4₄
GOP (n-1)
GOP (n)
GOP (n+1)
GOP (n+2)
GOP (n+3)
GOP (n+4)
GOP (n+5)
271
272
273
274
275
t_a t_b t_c t_d t_e
t_{a-7}
$t_{a+1\,(t_e-7)}$
t_{b-7}
t_{b+1}
t_{c-7}
t_{c+1}
t_{d-7}
t_{d+1}

FIG. 15

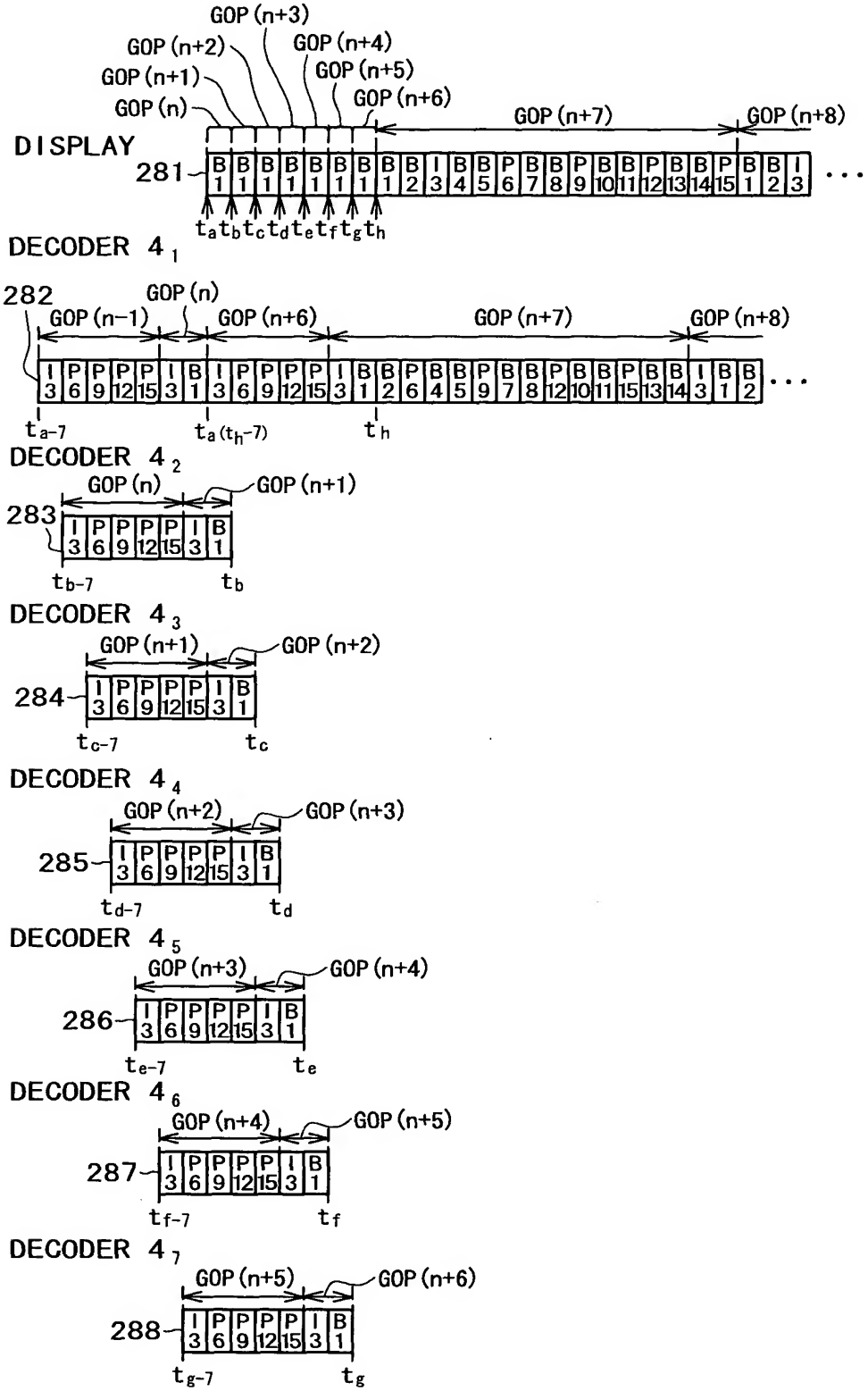

GOP (n)
GOP (n+1)
GOP (n+2)
GOP (n+3)
GOP (n+4)
GOP (n+5)
GOP (n+6)
GOP (n+7)
GOP (n+8)
DISPLAY
281
DECODER 4 1
282
GOP (n−1)
DECODER 4 2
283
DECODER 4 3
284
DECODER 4 4
285
DECODER 4 5
286
DECODER 4 6
287
DECODER 4 7
288

FIG. 16

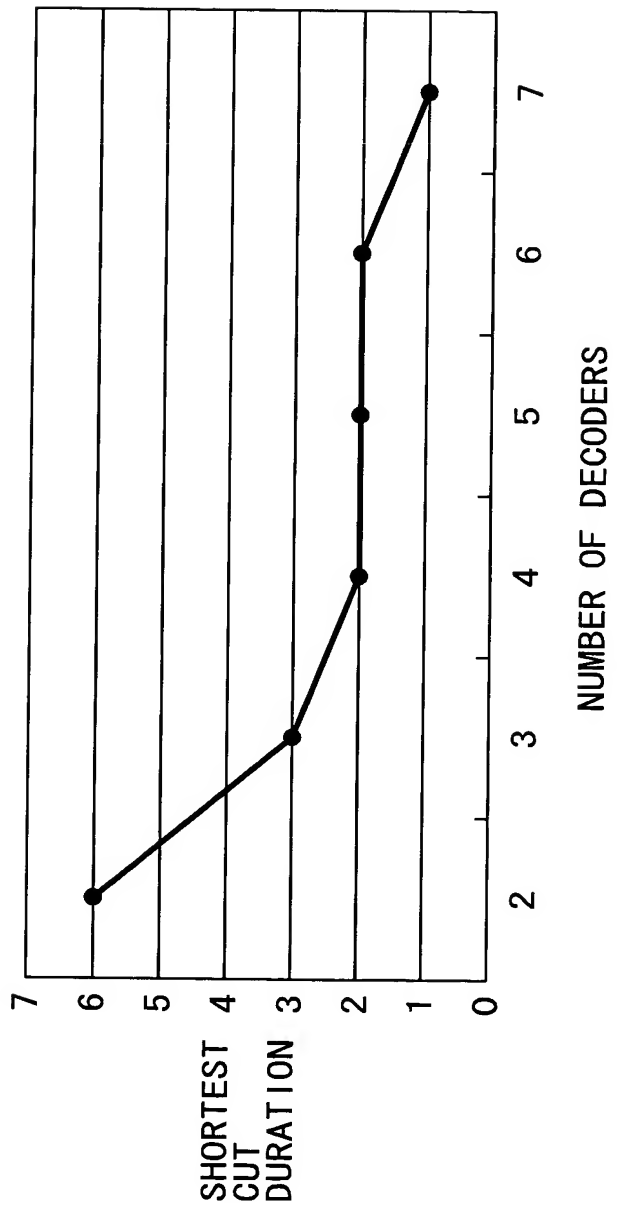


FIG. 17

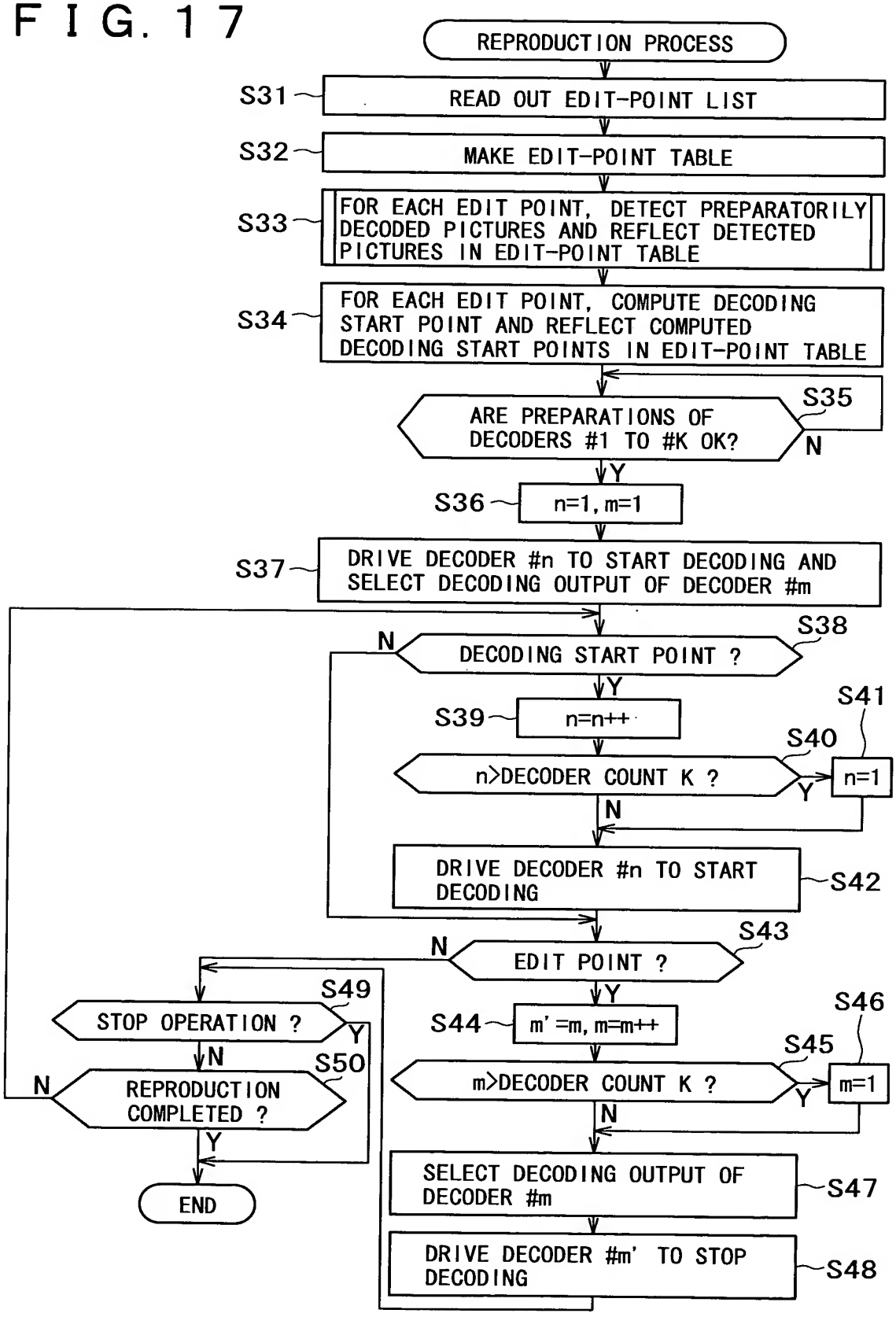

REPRODUCTION PROCESS
S31
READ OUT EDIT-POINT LIST
S32
MAKE EDIT-POINT TABLE
S33
FOR EACH EDIT POINT, DETECT PREPARATORILY DECODED PICTURES AND REFLECT DETECTED PICTURES IN EDIT-POINT TABLE
S34
FOR EACH EDIT POINT, COMPUTE DECODING START POINT AND REFLECT COMPUTED DECODING START POINTS IN EDIT-POINT TABLE
S35
ARE PREPARATIONS OF DECODERS #1 TO #K OK?
N
Y
S36
n=1, m=1
S37
DRIVE DECODER #n TO START DECODING AND SELECT DECODING OUTPUT OF DECODER #m
S38
N
DECODING START POINT ?
Y
S39
n=n++
S41
S40
n>DECODER COUNT K ?
Y
n=1
N
DRIVE DECODER #n TO START DECODING
S42
S43
N
EDIT POINT ?
Y
S49
STOP OPERATION ?
Y
N
S50
N
REPRODUCTION COMPLETED ?
Y
END
S44
m'=m, m=m++
S46
S45
m>DECODER COUNT K ?
Y
m=1
N
SELECT DECODING OUTPUT OF DECODER #m
S47
DRIVE DECODER #m' TO STOP DECODING
S48

FIG. 18

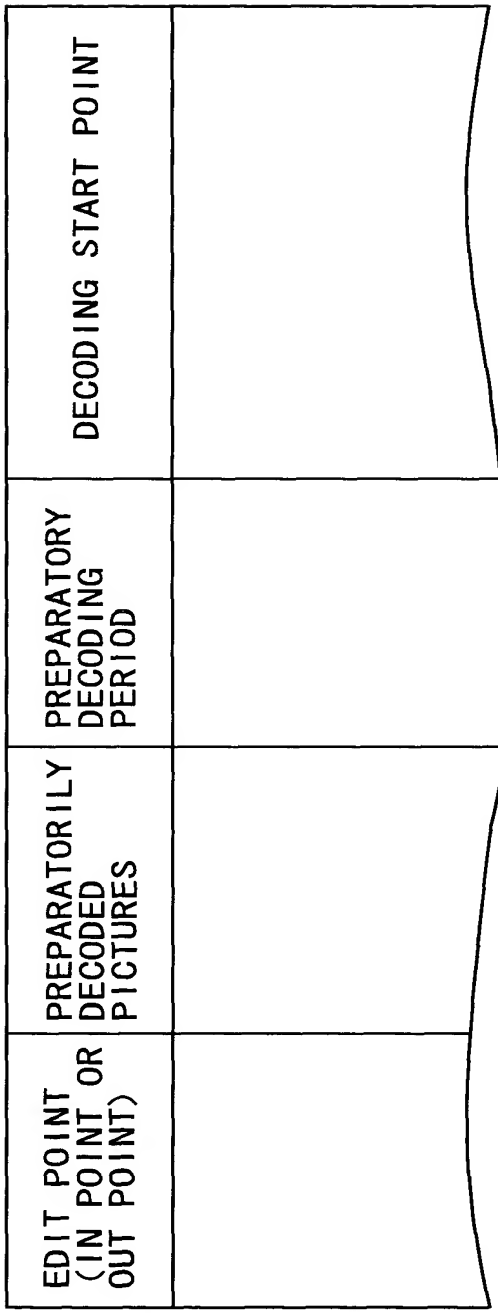

EDIT POINT (IN POINT OR OUT POINT)
PREPARATORILY DECODED PICTURES
PREPARATORY DECODING PERIOD
DECODING START POINT

FIG. 19

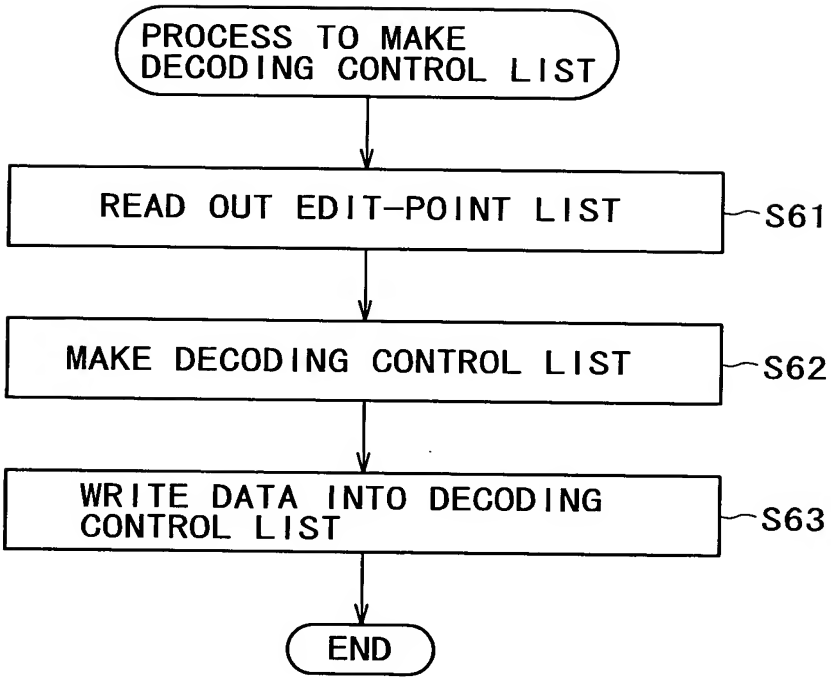

PROCESS TO MAKE DECODING CONTROL LIST
READ OUT EDIT-POINT LIST
S61
MAKE DECODING CONTROL LIST
S62
WRITE DATA INTO DECODING CONTROL LIST
S63
END

FIG. 20

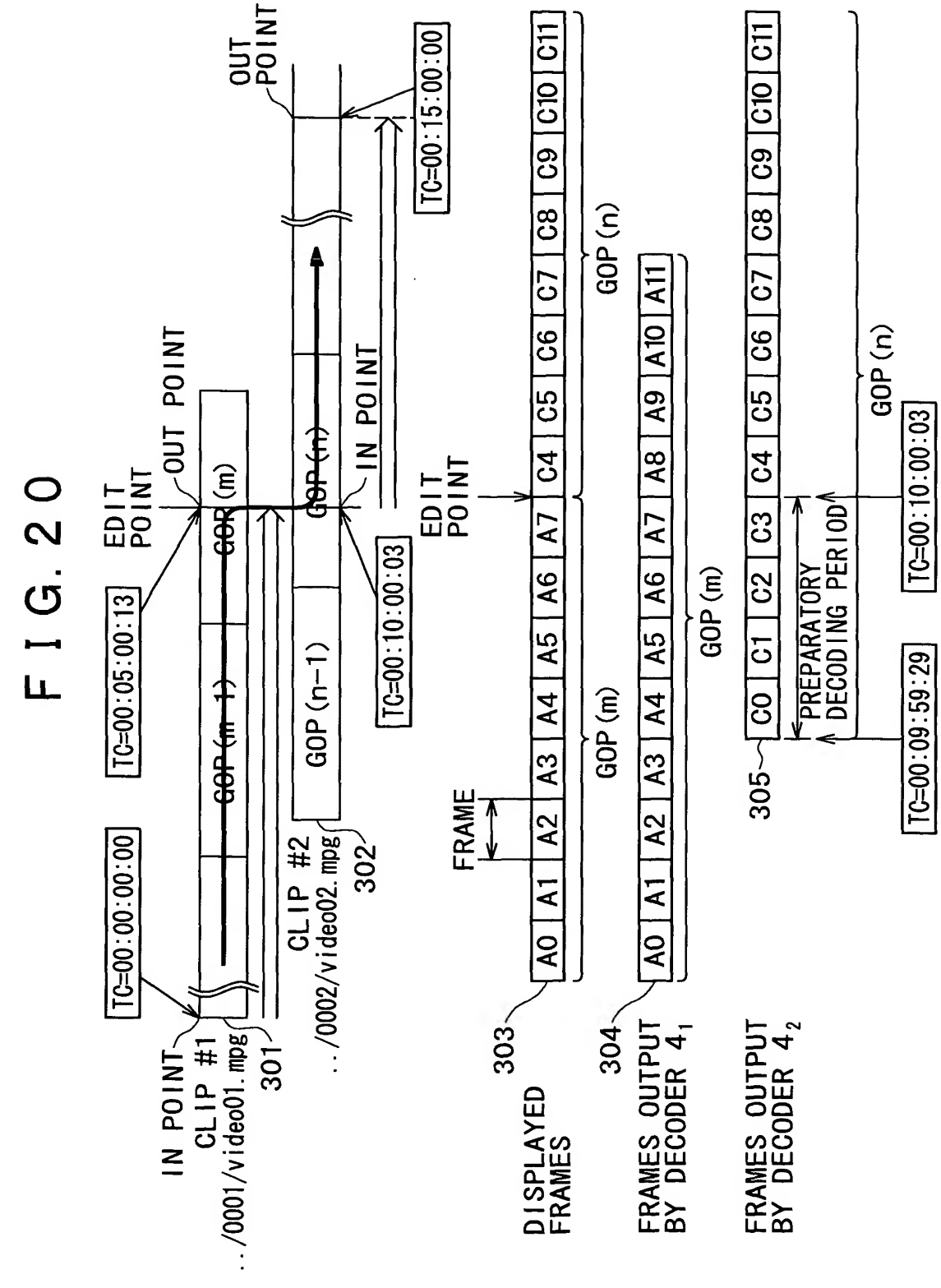
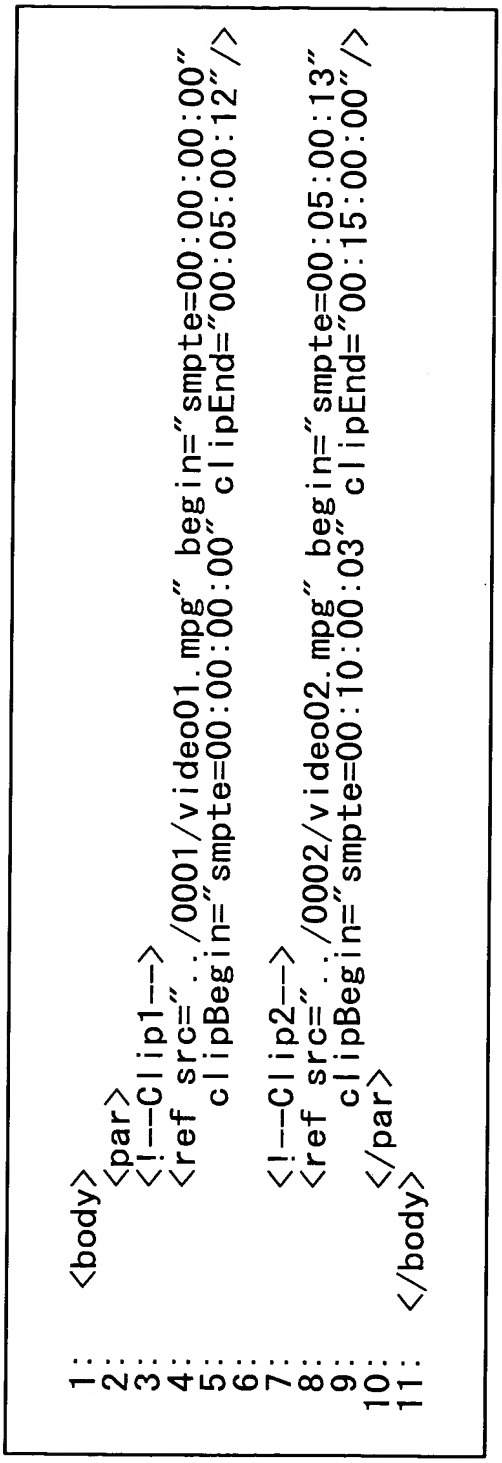

IN POINT
CLIP #1
../0001/video01.mpg
301
TC=00:00:00:00
TC=00:05:00:13
EDIT POINT
OUT POINT
GOP (m-1)
GOP (m)
CLIP #2
../0002/video02.mpg
302
GOP (n-1)
GOP (n)
IN POINT
OUT POINT
TC=00:10:00:03
TC=00:15:00:00
EDIT POINT
FRAME
303
DISPLAYED FRAMES
A0 A1 A2 A3 A4 A5 A6 A7 C4 C5 C6 C7 C8 C9 C10 C11
GOP (m)
GOP (n)
304
FRAMES OUTPUT BY DECODER 4₁
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11
GOP (m)
305
FRAMES OUTPUT BY DECODER 4₂
C0 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11
PREPARATORY DECODING PERIOD
GOP (n)
TC=00:09:59:29
TC=00:10:00:03

FIG. 21



```
1:  <body>
2:      <par>
3:          <!--Clip1-->
4:          <ref src="../0001/video01.mpg" begin="smpte=00:00:00:00"
5:              clipBegin="smpte=00:00:00:00" clipEnd="00:05:00:12"/>
6:
7:          <!--Clip2-->
8:          <ref src="../0002/video02.mpg" begin="smpte=00:05:00:13"
9:              clipBegin="smpte=00:10:00:03" clipEnd="00:15:00:00"/>
10:     </par>
11: </body>
```

FIG. 22

```
 1:   <body>
 2:        <par>
 3:        <!--Clip1-->
 4:        <ref src="../0001/video01.mpg" begin="smpte=00:00:00:00"
 5:            clipBegin="smpte=00:00:00:00" clipEnd="00:05:00:12"/>
 6:
 7:        <!--Clip2-->
 8:        <ref src="../0002/video02.mpg" begin="smpte=00:05:00:12"
 9:            clipBegin="smpte=00:10:00:03" clipEnd="00:15:00:00"
10:            preDecBegin="smpte=00:09:59:29" preDecDur="4"/>
11:       </par>
12:  </body>
```

FIG. 23

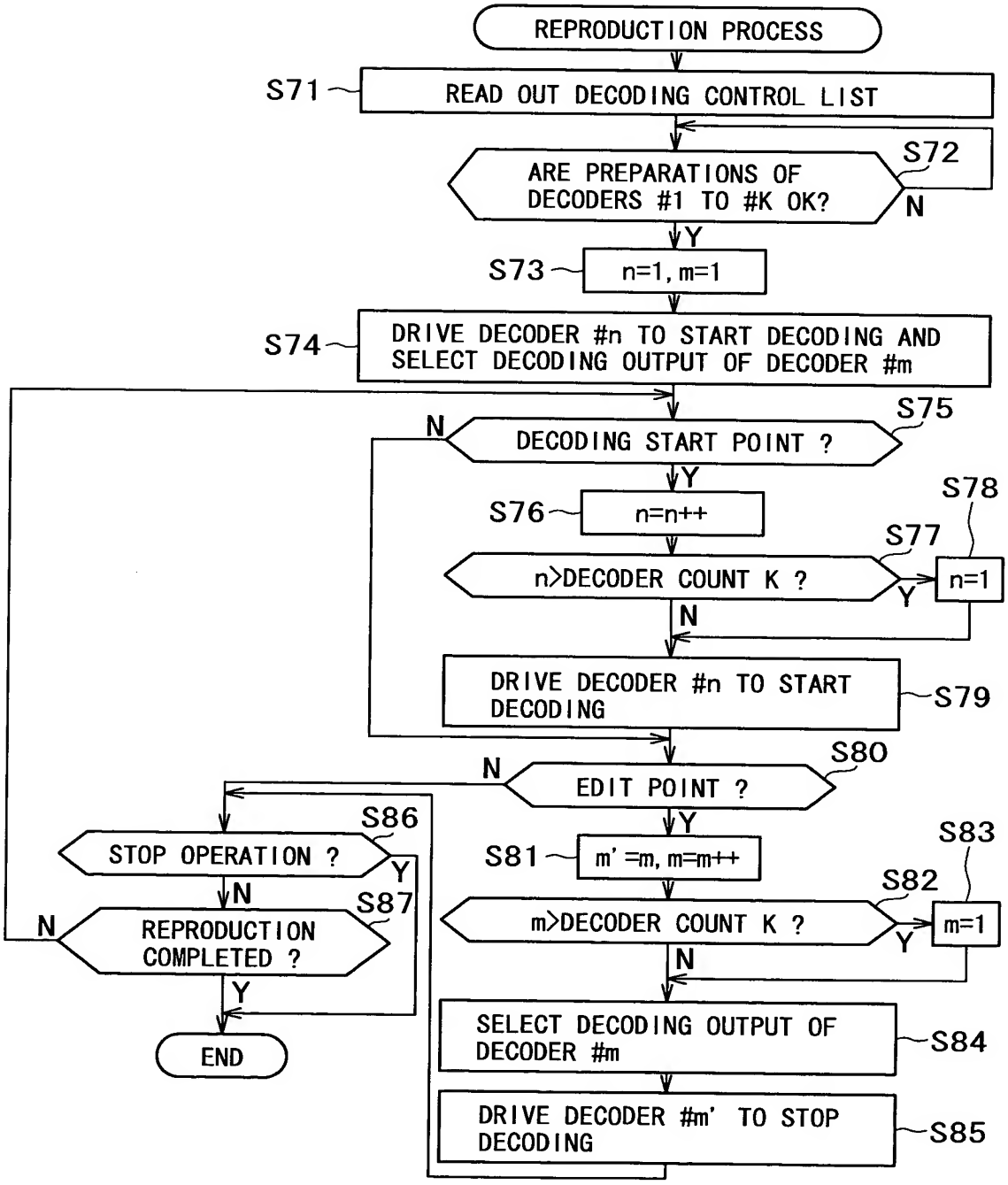

REPRODUCTION PROCESS
S71
READ OUT DECODING CONTROL LIST
S72
ARE PREPARATIONS OF DECODERS #1 TO #K OK?
N
Y
S73
n=1, m=1
S74
DRIVE DECODER #n TO START DECODING AND SELECT DECODING OUTPUT OF DECODER #m
S75
N
DECODING START POINT ?
Y
S76
n=n++
S78
S77
n>DECODER COUNT K ?
Y
n=1
N
DRIVE DECODER #n TO START DECODING
S79
S80
N
EDIT POINT ?
Y
S86
STOP OPERATION ?
Y
N
S87
N
REPRODUCTION COMPLETED ?
Y
END
S81
m'=m, m=m++
S83
S82
m>DECODER COUNT K ?
Y
m=1
N
SELECT DECODING OUTPUT OF DECODER #m
S84
DRIVE DECODER #m' TO STOP DECODING
S85

FIG. 24

```
 1:   <body>
 2:        <par>
 3:        <!--Clip1-->
 4:        <ref src="../0001/video01.mpg" begin="smpte=00:00:00:00"
 5:            clipBegin="smpte=00:00:00:00" clipEnd="00:05:00:12"
 6:            decoder="0"/>
 7:
 8:        <!--Clip2-->
 9:        <ref src="../0002/video02.mpg" begin="smpte=00:05:00:12"
10:            clipBegin="smpte=00:10:00:03" clipEnd="00:15:00:00"
11:            decoder="1"
12:            preDecBegin="smpte=00:09:59:29" preDecDur="4"/>
13:        </par>
14:  </body>
```

FIG. 25

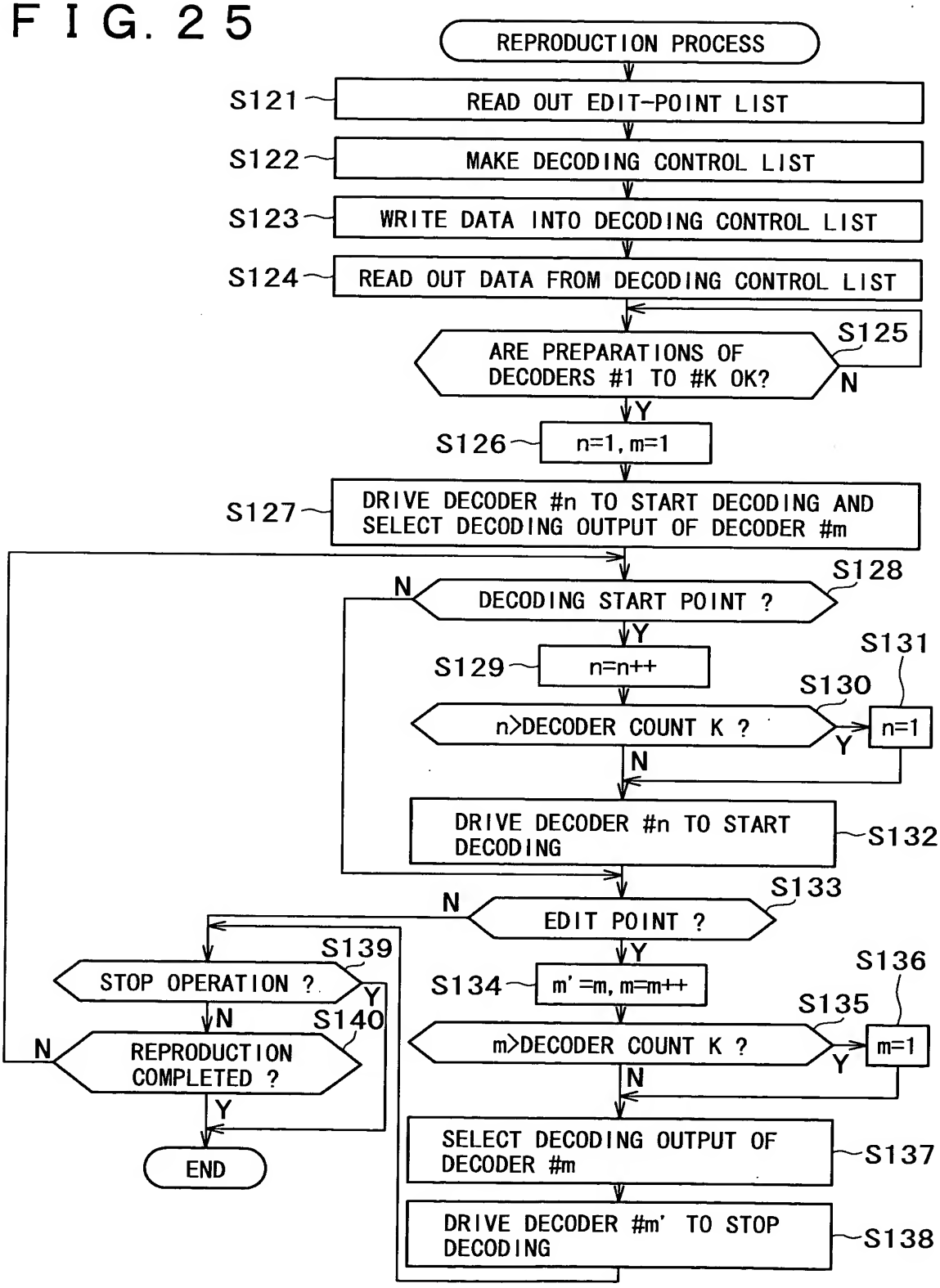
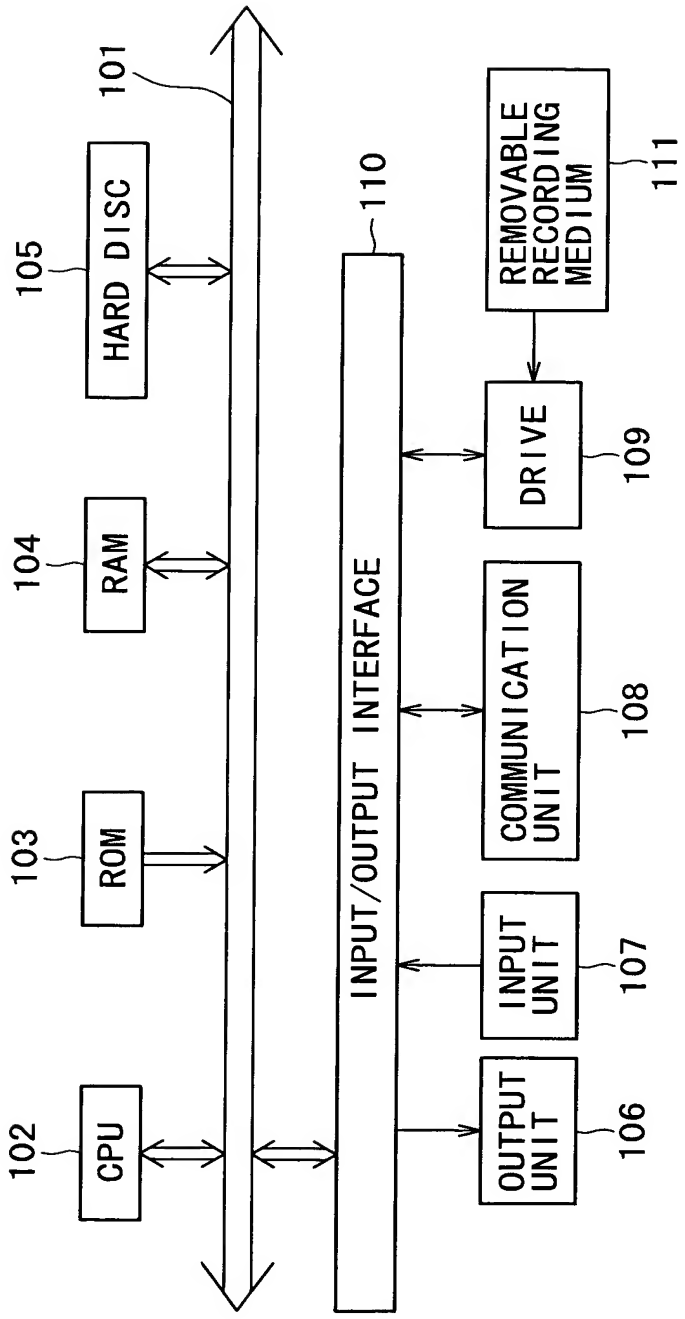

REPRODUCTION PROCESS
S121
READ OUT EDIT-POINT LIST
S122
MAKE DECODING CONTROL LIST
S123
WRITE DATA INTO DECODING CONTROL LIST
S124
READ OUT DATA FROM DECODING CONTROL LIST
S125
ARE PREPARATIONS OF DECODERS #1 TO #K OK?
N
Y
S126
n=1, m=1
S127
DRIVE DECODER #n TO START DECODING AND SELECT DECODING OUTPUT OF DECODER #m
S128
N
DECODING START POINT ?
Y
S129
n=n++
S131
S130
n>DECODER COUNT K ?
Y
n=1
N
DRIVE DECODER #n TO START DECODING
S132
S133
N
EDIT POINT ?
Y
S139
STOP OPERATION ?
Y
N
S140
N
REPRODUCTION COMPLETED ?
Y
END
S136
S134
m'=m, m=m++
S135
m>DECODER COUNT K ?
Y
m=1
N
SELECT DECODING OUTPUT OF DECODER #m
S137
DRIVE DECODER #m' TO STOP DECODING
S138

FIG. 26


101
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